

CLAIMS

1. A device for applying a liquid to a substrate surface, the device comprising a chamber for carrying the liquid, an aperture in the chamber for communicating liquid from the chamber to the substrate surface via a conduit having outer sides of limited wettability to the liquid.
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2. A device as claimed in claim 1, having a body including a protrusion defined by the outer sides of the conduit.
3. A device as claimed in claim 1, wherein the conduit
10 comprises inner sides wettable by the liquid.
4. A device as claimed in any preceding claim, wherein the body comprises a plane inner surface surrounding the protrusion and a plane outer surface parallel to, offset from, and surrounding the inner surface, the protrusion extending from the inner surface
15 and having an end coplanar with outer surface.
5. A device as claimed in claim 4, wherein the inner surface forms a peripheral recess surrounding the protrusion.
6. A device as claimed in claim 4, wherein the outer surface is of limited wettability to the liquid.
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7. A device as claimed in claim 4, wherein the end of the protrusion is wettable by the liquid.
8. A device as claimed in claim 1, comprising: a first chamber for carrying the liquid; a second chamber for carrying the liquid; a first aperture in the first chamber for communicating liquid from the first chamber to the substrate surface via a first conduit having outer sides of limited wettability to the liquid; and, a second aperture in the second chamber for
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communicating liquid from the second chamber to the substrate surface via a second conduit having outer sides of limited wettability to the liquid.

9. A device as claimed in claim 8, having a body
5 including a protrusion defined by the outer sides of the first and second conduits.

10. A device as claimed in claim 8 or claim 9, wherein the first and second conduits comprise inner sides wettable by the liquid.

11. A device as claimed in any of claims 8 to 10, wherein the body comprises a plane inner surface surrounding the protrusion and a plane outer surface parallel to, offset from, and surrounding the inner surface, the protrusion extending from the inner surface and having an end coplanar with outer surface.
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12. A device as claimed in claim 11, wherein the inner surface
15 forms a peripheral recess surrounding the protrusion.

13. A device as claimed in claim 11, wherein the outer surface is of limited wettability to the liquid.

14. A device as claimed in claim 11, wherein the end of the protrusion is wettable by the liquid.

20 15. A device as claimed in claim 14, wherein the end of the protrusion comprises a flow path extending from the first aperture to the second aperture.

25 16. A device as claimed in claim 15, wherein: the first chamber has a first pressure for retaining the liquid when the flow path is remote from the substrate surface; the second chamber has a second pressure such that the difference between the first and second pressures is oriented to promote flow of the liquid from

the first chamber to the second chamber via the flow path in response to the flow path being located proximal to the substrate surface and the liquid in the device contacting the substrate surface; and, the first and second pressures are such that the 5 liquid is drawn towards at least the second chamber in response to withdrawal of the flow path from the substrate surface.

17. A device as claimed in claim 16, wherein at least one of the first chamber and the second chamber comprises a capillary network for applying pressure to the liquid.
- 10 18. A device as claimed in claim 17, wherein the or each capillary network comprises at least one of a plurality of parallel capillary members, a mesh, a porous material, and a fibrous material.
- 15 19. A device as claimed in any of claims 15 to 18, comprising a plurality of first chambers each coupled to the flow path.
20. A device as claimed in any of claims 15 to 19, comprising a plurality of second chambers each coupled to the flow path.
- 20 21. A device as claimed in any of claims 15 to 20 wherein the flow path has one of a curved cross section and a rectangular cross section.
22. A device as claimed in any of claims 15 to 21, wherein the first and second pressures are such that the liquid is drawn towards the first chamber and the second chamber in response to withdrawal of the flow path from the substrate surface.
- 25 23. A device as claimed in any of claims 15 to 22, wherein the second aperture surrounds the first aperture.

24. A device as claimed in any preceding claim of unitary construction.
25. A device as claimed in claim 24, formed from any one of polymer, glass, silicon, SU-8, photoresist, thermoplastic, 5 ceramic, and metal.
26. A device as claimed in any claim preceding claim 24 of layered construction.
27. A device as claimed in claim 26, wherein each layer is formed from one of polymer, glass, silicon, SU-8, photoresist, 10 thermoplastic, metal, and ceramics.
28. An array of devices each as claimed in any preceding claim.
29. A method for applying a liquid to a substrate surface, the method comprising: locating a device as claimed in any of claims 1 to 14 proximal to the substrate surface; supplying the liquid 15 to the substrate surface via the device; and, retracting the device from the substrate surface.
30. A method for applying a liquid to a substrate surface, the method comprising: locating a device as claimed in any of claims 15 to 23 proximal to the substrate surface; supplying the liquid 20 to the substrate surface via the device; flowing the liquid from the first chamber to the second chamber via the flow path; and, retracting the device from the substrate surface.
31. A method as claimed in claim 30, further comprising varying the flow of the liquid from the first chamber to the second 25 chamber during the supply of the liquid to the surface.
32. A method as claimed in claim 29 to 31, further comprising: prior to the retracting, moving the device relative to the

substrate surface with the liquid in the or each aperture contacting with the substrate surface.

33. A method for applying a liquid to a substrate surface, the method comprising: locating a device as claimed in any of claims 5 8 to 14 proximal to the substrate surface; supplying the liquid to the substrate surface via the device; moving the device relative to the substrate surface with the liquid in the apertures contacting with the substrate surface; and, retracting the device from the substrate surface.

10 34. A method as claimed in claim 33, comprising orienting the device relative to the substrate surface such that traces of the liquid produced as the device is moved relative to the substrate surface remain separate.

15 35. A method as claimed in claim 33, comprising orienting the device relative to the substrate surface such that traces of the liquid produced as the device is moved relative to the substrate surface overlap.

20 36. A method as claimed in any of claims 33 to 35, further comprising, prior to locating, loading a similar liquid into the first and second chambers.

37. A method as claimed in any of claims 33 to 35, further comprising, prior to locating, loading different liquids into the first and second chambers.

25 38. A method for applying a liquid to a substrate surface, the method comprising: locating an array of devices as claimed in any of claims 15 to 22 proximal to the substrate surface; supplying the liquid to the substrate surface via the array; in each device of the array, flowing the liquid from the first chamber to the second chamber via the flow path; moving the array relative to

the substrate surface with the liquid in each aperture contacting with the substrate surface; and, retracting the array from the substrate surface.

39. A method as claimed in claim 38, further comprising, in at least one device of the array, varying the flow of the liquid from the first chamber to the second chamber during the supply of the liquid to the surface.

40. A method as claimed in claim 38 or claim 39, comprising orienting the array relative to the substrate surface such that traces of the flows of liquid produced as the array is moved relative to the substrate surface remain separate.

41. A method as claimed in claim 38 or claim 39, comprising orienting the array relative to the substrate surface such that traces of the flows of liquid produced as the array is moved relative to the substrate surface overlap.

42. A method as claimed in any of claims 38 to 41, further comprising, prior to locating, loading a similar liquid into each device of the array.

43. A method as claimed in any of claims 38 to 41, further comprising, prior to locating, loading different liquids into each device of the array.